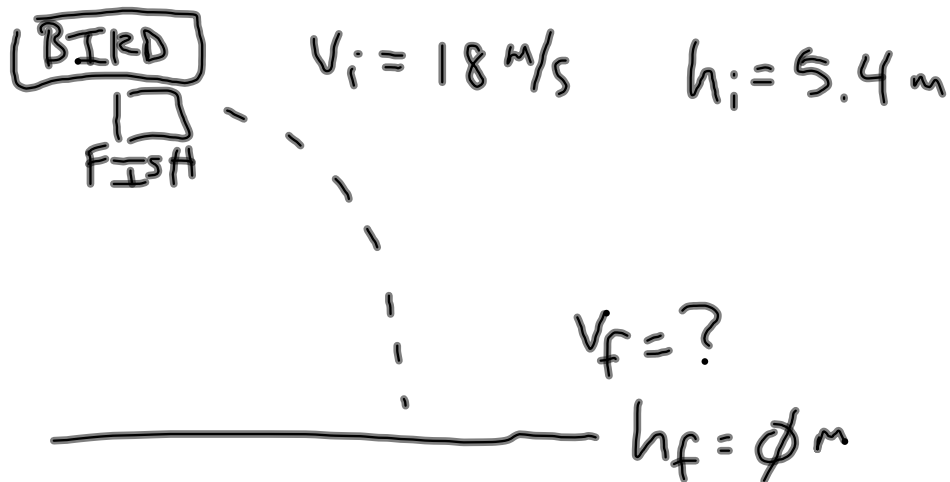


Practice Problems 4.18.12 CP Physics

A bird is flying with a speed of 18 m/s over water when it accidentally drops a 2.0 kg fish. If the altitude of the bird is 5.40 m and friction is disregarded, what is the speed of the fish when it hits the water?



$$K_i + U_{gi} = K_f + \cancel{U_{gf}}$$

$$\frac{1}{2} V_i^2 + a_g h_i = \frac{1}{2} V_f^2$$

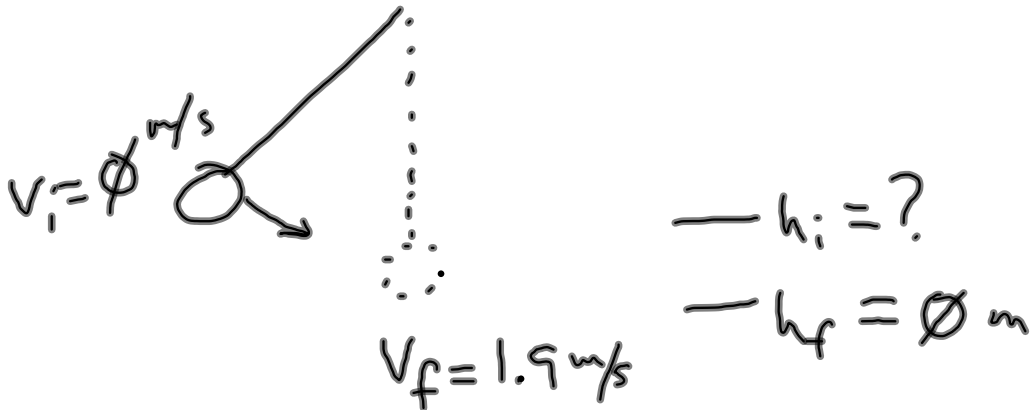
$$V_f = \sqrt{V_i^2 + 2 a_g h_i}$$

$$= \sqrt{(18 \text{ m/s})^2 + 2 (9.8 \text{ m/s}^2) (5.4 \text{ m})}$$

$$= 20.73 \text{ m/s}$$

Practice Problems 4.18.12 CP Physics

A pendulum bob is released from some initial height such that the speed of the bob at the bottom of the swing is 1.9 m/s. What is the initial height of the bob?



$$\frac{1}{2} v_i^2 + a_g h_i = \frac{1}{2} v_f^2 + a_g h_f$$

$$h_i = \frac{v_f^2}{2 a_g}$$

$$= \frac{(1.9 \text{ m/s})^2}{2 (9.8 \text{ m/s}^2)}$$

$$= .184 \text{ m}$$

### Practice Problems 4.18.12 CP Physics

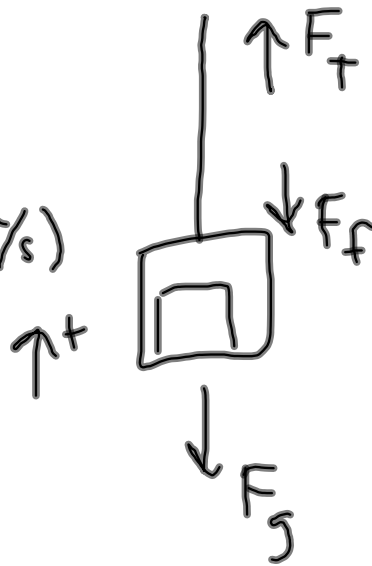
A 1000 kg elevator carries a maximum load of 800 kg. A constant frictional force of 4000 N retards the elevator's motion upwards. What minimum power, in kilowatts, must the motor deliver to lift the fully loaded elevator at a constant speed of 3.0 m/s?

$$P = F_T v$$

$$= (21640 \text{ N})(3 \text{ m/s})$$

$$= 64920 \text{ W}$$

$$= 64.9 \text{ kW}$$



$$\Sigma F = 0$$

$$F_T - F_g - F_f = 0$$

$$F_T = F_g + F_f$$

$$= (1800 \text{ kg})(9.8 \text{ m/s}^2) + 4000 \text{ N}$$

$$= 21640 \text{ N}$$